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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/810,983
Filing Date: March 26, 2004
Appellant(s): WANG ET AL.

Anna M. Budde
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 19 January 2010 appealing from the final Office action mailed 30 June 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,032,592	OGIHARA et al.	6-1977
4,568,431	POLAN et al.	2-1986
4,568,438	LAUKE	2-1986

6,264,823 B1 HOFFMAN, JR. et al. 7-2001

Zaki, Nabil "Electrocleaning" 2000, Vol. 98, Issue 1, pages 134-139.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

o Claims 1, 2, 4, 6-9, 11-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman, Jr. et al. (U.S. Patent No. 6,264,823 B1) in view of Zaki ("Electrocleaning", 2000, Vol. 98, Issue 1, pages 134-139) and Polan et al. (U.S. Patent No. 4,568,431). Hoffman's invention is directed to a non-caustic cleaning of conductive and non-conductive bodies. With regards to claim 1, Hoffman discloses a method comprising the step of immersing a conductive body (such as grocery cart, metallic brake shoe or motor vehicle engine head) to be cleaned in a cleaning bath containing an aqueous solution containing disodium phosphate and sodium carbonate having a pH greater than 7.0 and less than about 10.0 (read on the recited non-aggressive base) and connecting the body to a cathode of a direct current power source to electrically clean the body wherein the attachment of deposits and contaminants, such as smuts, to outer surfaces of the body are removed from the body by the cathodic electrocleaning (see abstract; Fig. 4 or 5; c. 1, l. 29-44 and c. 4, l. 1-8; and Examples 2, 3 and 7). Hoffman also discloses that it is known to clean the body prior to coating (c. 1, l. 17-44), the removal of removed surface contaminants may float on the top of the cleaning solution (c. 8, l. 55-58), and to avoid degradation of the actual body being cleaned, that is the cleaning should not harm the

body itself but rather should affect only the contaminants and other materials of which removal is desired, the power source is selected for actual body being cleaned to operate at about 1 amp per gallon of cleaning solution to about 20 amps per gallon of cleaning solution (c. 3, l. 59-61 and c. 7, l. 13-32). As such, Hoffman discloses the preferred range of amps for the actual cleaning of the body without attacking the metal body. The differences between Hoffman and the claim are the recited metal particle matter as contaminants to be removed from the body, producing gaseous hydrogen, current density and transporting.

As to the first and second differences, Zaki, a reference cited by Applicant, teaches in the abstract "[t]he basis function of electrocleaners is to remove soils from the surface that could not be removed by simply immersion soak and degreasing steps", where the soils including finely divided particles, such as metallic fines (generally referred to as smut). Zaki also teaches in page 134 the liberation of hydrogen at the cathode. As such, Hoffman's smut includes metal particle matter and the producing due to electrolysis is inherent in Hoffman's cathodicallly cleaning method.

As to the third difference, the recited current density, Zaki also teaches in page 136 under section of operating parameters and process considerations that electrolysis is the main driving process in electrocleaning, the amount of gassing responsible for the scrubbing action at the electrodes is a function of the amount of current passing through the cell, parameters controlling current should be considered, the adequate recommended

current densities for different basis metals are summarized in Table I, values below the recommended current densities produce light to marginal electrocleaning, and higher values generally lead to etching and roughness of the surfaces. Polan teaches in a process for producing electroplated copper foil, the steps of electrolytic cleaning the copper foil prior to the electroplating (c. 5, l. 3-68) with a caustic solution at a current density of 1 mA/cm^2 (0.1 A/dm^2) to 500 mA/cm^2 (50 A/dm^2). As such, based on the teachings of Zaki and Polan for a body of copper for example where the recommended current density in Zaki is 5-8 A/dm^2 and that of Polan is 0.1-50A/dm^2, it appears that the current density in an electrocleaning is an optimizing variable. One skilled in the art would made to have modified Hoffman's teachings as shown by Zaki and Polan to consider a lower current density with the result of producing a light or marginal electrocleaning of the body in addition to a higher current density to effectively remove the surface contaminants from the body with the result of producing an actually electrocleaning of the body without attacking the body. Further, based on the claimed current density of less than one A/dm^2 which includes values closer to zero current density and absence of proven criticality of the recited range, it appears that, at the recited range, minimal amount of gassing is produced to either sufficiently remove the metal particle matter which is lightly held to the surface body or produce light or marginal electrocleaning, and the recited range is an optimizing variable. And the use of an electrocleaning at a low current density such as the recited range to either dislodge metal particle matter lightly adhered to a

body or to produce light or marginal electrocleaning would have been within the level of ordinary skill in the art. Further, it has been settled that proper adjustment of a known effective variable of a known or obvious process is within the capabilities of one having ordinary skill in the art, *In re Aller* 105 USPQ 233.

As to the transporting step, Polan also teaches the provision of a surface impurity-removing means including a skimmer floating on the surface of a treating solution (c. 2, l. 39-55) and the continuous withdrawal of solution from tank **14** (Fig. 2). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Hoffman's teachings as shown by Polan because this would result in removing surface impurities and contaminants from a bath.

o Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman '823 in view of Zaki and Polan '431 as applied to claims 1, 2, 4, 6-9, 11-17 and 20 above, and further in view of Lauke (U.S. Patent No. 4,568,438). Polan as applied above further discloses in col. 9, line 56 through col. 10, line 54 the continuous withdrawal of the solution to remove the surface impurities or contaminants from the treatment tank 14. The difference between the references as applied above and the instant claim is the provision of the recited eductor. Lauke teaches in a method for making an electro-immersion finish the limitation (Figs. 1 and 2). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified

the references' teachings as shown by Lauke because the selection of any of known recirculation of the solution with contaminant removal would have been within the level of ordinary skill in the art.

o Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman '823 in view of Zaki and Polan '431 as applied to claims 1, 2, 4, 6-9, 11-17 and 20 above, and further in view of Ogihara et al. (U.S. Patent No. 4,032,592). The difference between the references as applied above and the instant claim is the provision of recited cleaning solution. Ogihara teaches the limitation (Fig. 2 and c. 6, l. 20-62). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references' teachings as shown by Ogihara because the selection of any of known cleaning solutions would have been within the level of ordinary skill in the art.

(10) Response to Argument

o Appellants argues that "[c]laims 1, 2, 4, 6-9, 11-17, and 20 are patentable because the combination of the Hoffman, Jr., Zaki, and Polan references fails to provide a reason to use a current density of less than one A/dm^2 with a non-aggressive acid or base electrolyte medium, but instead teaches away from using such conditions together". The examiner finds this is unpersuasive. Though none of the references specifically provides the reason, however, since Hoffman discloses the preferred range of amps for the actual

cleaning of the body without attacking the metal body and since Zaki teaches that the amount of gassing responsible for the scrubbing action at the electrodes is a function of the amount of current passing through the cell and current density values below the adequate recommended current density ranges produce light to marginal electrocleaning, it appears that the current density in an electrocleaning is an optimizing variable and one skilled in the art would like to have modified Hoffman's teachings as shown by Zaki and Polan to consider a lower current density with the result of a light or marginal electrocleaning of the body in addition to a higher current density to effectively remove the surface contaminants from the body with the result of an actually electrocleaning of the body without attacking the body. Further, based on the claimed current density of less than one A/dm^2 which includes values closer to zero current density and absence of proven criticality of the recited range, it appears that at this recited range minimal amount of gassing is produced to either sufficiently remove the metal particle matter which is lightly held to the surface body or produce light or marginal electrocleaning, and the recited range is an optimizing variable.

o Appellant argues that "the combined references teach away from using a current density of less than one A/dm^2 to clean adhered metal particle matter from a conductive surface even for caustic, highly alkaline cleaning solutions; thus, there would be no expectation of success whatever in modifying such processes to use non-aggressive acid or base as an electrolyte medium in conjunction with a current density of less than one A/dm^2

to remove adhered metal particle matter. The examiner disagrees. Polan teaches the use of a current density of 1 mA/cm^2 (0.1 A/dm^2) to 500 mA/cm^2 (50 A/dm^2), that is overlapping the recited range, in a caustic solution to clean adhered contaminants from a conductive surface. Zaki teaches the adhered contaminants included metallic fines referred as smut. And since Hoffman teaches the use of non-aggressive base as an electrolyte medium over a caustic solution, a highly alkaline solution, which is known to attack metal itself, one skilled in the art would combine Hoffman's teachings with that of Zaki and Polan by considering a lower current density with the result of a light or marginal electrocleaning of the body in addition to a higher current density which is known to effectively remove the surface contaminants from the body with the result of an actually electrocleaning of the body without attacking the body.

As to the argument to the rejection of claim 3 starting in page 8 of the appeal based on the combination of Hoffman, Zaki and Polan with Lauke and claim 18 starting in page 9 of the appeal based on the combination of Hoffman, Zaki and Polan with Ogihara, the rejection to each of claim stands for dependent upon rejected claim 1 and for the statement of the motivation to combine in each rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Kishor Mayekar/

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Conferees:

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/Dah-Wei D. Yuan/

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